

Expansion Plans Vie With Budget Considerations at NSLS Users' Meeting, May 21-24, 2001

Karen McNulty Walsh

From May 21 to May 24, a record-breaking 370 attendees, including 107 students and postdocs, participated in BNL's National Synchrotron Light Source annual Users' Meeting. It featured workshops, vendor exhibits, a poster session, social events, and talks updating the community on progress and plans for the Lab's most prolific research facility.

Excitement about nanoscience, increasing the number of users, and concerns about budgets were recurring themes at the meeting. "The Light Source has always been a leader at Brookhaven," said Laboratory Director John Marburger in his remarks opening the main meeting on Tuesday, May 22. He also commented that he is "guardedly optimistic" about future expansion of its research programs given recent budgetary challenges.

The Lab Director added, "We are investing in improving the quality of life for users . . . and I am excited about developing facilities for nanotechnology that would be complementary to existing facilities, as well as upgrading existing facilities to expand their capabilities."

Nanoscience center

Richard Osgood Jr., Associate Laboratory Director for Basic Energy Sciences, followed Marburger's welcome by presenting DOE's Nanoscience Initiative. He emphasized that a proposed nanocenter at BNL could foster collaborations with university and industrial partners, as well as interdisciplinary work among scientists at BNL. Osgood described the proposed center as a building attached to the NSLS that would have a bridge connecting to the Instrumentation Division, Bldg. 535, as well. The center would house laboratory clusters focused on topics such as materials synthesis, nanofabrication, proximal probe microscopy, and ultra-fast optical science.

The interdisciplinary approach - involving chemistry, physics, materials science, instrumentation, and even biology - along with the ability to prepare materials on site, a new beam line, and enhanced ability to make very high-resolution zone plates for x-ray micros-



At the May 2001 meeting are: (front, from left Simon Bare, UOP LLC and Chair, Users' Executive Committee; Patricia Dehmer, Associate Director of Science, DOE's Office of Basic Energy Sciences (BES); John Marburger, BNL Director; (back, from left) Iran Thomas, BES Deputy Associate Director; Richard Osgood, Associate Laboratory Director for Basic Energy Sciences; and Steven Dierker, National Synchrotron Light Source Chair.

copy, will help draw in outside partners, and perhaps also funding, Osgood said.

While the funding picture for nanoscience looks good, Osgood said, he and other speakers stressed the need to help the public and Congress understand the importance of funding the physical sciences in general.

"Public attitudes drive funding," said Pat Dehmer, DOE's Associate Director of Science for Basic Energy Sciences. She emphasized that, while public confidence in scientific leadership has remained fairly stable through the years, it is not based on knowledge of science, which makes that support rather tenuous. "This puts a burden on us to educate the public and Congress," she said, "if the budget picture is to improve."

"The NSLS is going to have to operate with a very tight belt in the next year," Dehmer stated. Yet, she was optimistic about the potential for scientific advances. "We are on the verge of really explosive discoveries in chemistry and materials science," she said. Steve Dierker, the new NSLS Chair, shared this cautiously optimistic view, emphasizing the quantity and quality of scientific publications coming out of the NSLS. He commented that the capabilities of the NSLS continue to be in strong demand, with a record 2,551 users in 2000. Even more important, Dierker pointed out, the

scientific impact of work done at the NSLS continues to be strong.

Notable successes

Some notable successes of the past year include: determination of the atomic resolution crystal structure of the ribosome; x-ray diffraction measurements that provide new insight into the origin of ultrahigh piezoelectricity in relaxor ferroelectrics; and near-edge x-ray absorption fine-structure (NEXAFS) studies of “mechanically assembled monolayers” (MAMs), whose surface properties, such as wetting and lubrication, can be tailored for superior performance.

“Our aim must be to continue to develop the Light Source to maintain this excellence and its usefulness to scientists,” Dierker stated. However, he continued, “We must do this in the face of several challenges, including an aging infrastructure, the demands of the largest user program of any synchrotron facility, and tight budgets.”

New opportunities

With increasingly diverse areas of science recognizing the power of synchrotron radiation, Dierker predicts that the number of users will continue to grow. This growth can open opportunities for collaborative research that can draw in outside funding, such as the NIH-funded structural biology consortium initiated last year. Some research areas he cited that might benefit from this approach included catalysis, materials science, soft matter physics, and studies of magnetic materials.

“Many of these fields would benefit by combining suites of beam lines to provide access to many techniques and mechanisms for rapid access and quick turn-

around,” he said. Such a setup could also serve a larger number of users and provide for more cost-effective maintenance of facilities.

Dierker also discussed efforts to expand the user base through partnerships with nearby universities and industries, as well as through educational outreach programs.

Machine upgrades

A review of recent and planned upgrades to the NSLS machine was presented at the meeting by NSLS Deputy Chair Sam Krinsky. “At the NSLS there is an active program to continually improve the accelerator and beam-line systems and to add new capabilities,” he said.

In recent years the x-ray ring’s energy has been increased and emittance reduced. Also, plans exist to install two new in-vacuum undulators in the RF straights. Within the vacuum ultraviolet ring, the orbit stability has been improved by a new digital orbit feedback system, and a new set of infrared beam lines is now on line.

Looking further into the future, Krinsky said, the NSLS is pursuing research and development in free electron lasers and exploring the potential of a new light source based on a photo-injected energy recovery linac.

The meeting’s keynote speaker, Jane “Xan” Alexander, Acting Director of the Defense Advanced Research Projects Agency (DARPA), stated that her agency’s funding picture was looking good and that it funds many DOE labs.

DARPA is currently expanding studies that help push the limits of computer technology.

For example, by creating “molecular electronics,” such as circuits based on carbon nanotubes, it might be possible to develop computer chips on a scale that is 10,000 times smaller than today’s. One idea would be to have these circuits assemble themselves from the molecular level -an alternative to the current “slice-and-dice” method of making chips. “It’s a very different way of thinking about the world,” Alexander said.

Another different approach would be to develop electronics based on spin rather than charge, which, she said, could yield much faster devices and unbreakable codes.

Workshops, posters

Before and after the main meeting, users attended seven workshops arranged by Dan Fischer, National Institute of Standards & Technology. Topics included: advanced detector develop-



The 2001 Users' Meeting Planning Committee are: (front, from left) Mary Anne Corwin, BNL; Chi-Chang Kao, BNL; Lisa Miller, BNL; Nancye Wright, BNL; Daniel Fischer, National Institute of Standards & Technology at BNL; (back, from left) Susan Wirick, Stony Brook University; Simon Bare, UOP LLC and Users' Executive Committee Chair; and Lydia Rogers, BNL.

ment, environmental molecular sciences, catalytic studies, structural biology, nanoscience, EXAFS data modeling, and infrared microspectroscopy.

"This year the users' meeting planning team put special emphasis on the workshops, doubling the budget for each workshop organizer," Fischer said. "This supported many exciting invited speakers, which attracted an overflow attendance beyond our expectations."

At the poster session held on Monday evening during the welcome reception, students and postdocs presented 40 of the 60 posters. "The wide variety of topics presented was representative of the user community at the NSLS," said Lisa Miller, NSLS, who organized the poster session.

Four awards were given for the best student/postdoc posters based on scientific discipline. Winners

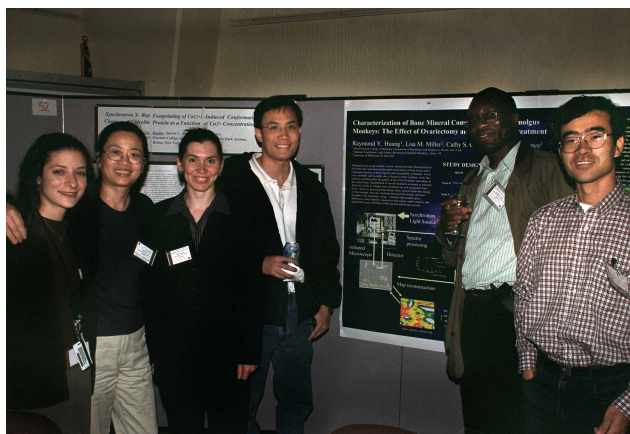
included: Kaveh Adib of Columbia University, Cecilia Sanchez-Hanke of BNL, Raymond Huang of Albert Einstein College of Medicine, and Zikri Yusof of the University of Connecticut. Each winner received a \$75 American Express gift check. The winning posters will be displayed in the NSLS lobby.

And despite the cool, wet weather, users enjoyed themselves at a Tuesday night luau in Berkner Hall, complete with tropical decorations and cuisine. "The meeting emphasized everything that the NSLS is about: excellent science, participation, and cooperation -and having some fun in amongst it all. This year's meeting was a tremendous success and illustrates that the NSLS has a very bright future," concluded Users' Executive Committee Chair Simon Bare of UOP LLC.

[Editor's note: Reprinted with permission from the BNL Bulletin - June 8, 2001.]



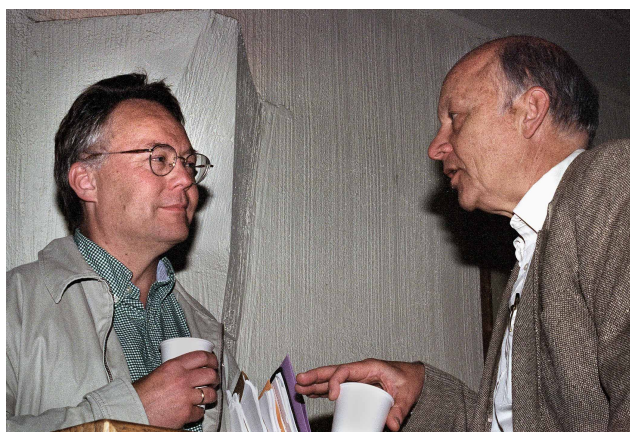
Samuel Krinsky (left), Steve Dierker, Ilan Ben-Zvi, and Peter Paul, all of BNL.



Pam Bromberg (left), Qin He, Jana Kieslar, Raymond Huang, Narcisse Komar, and Jin-Qu Guan, all of Albert Einstein College of Medicine.



Mark Chance, Albert Einstein College of Medicine (left); Thomas Weber, Director, Division of Materials Research, National Science Foundation.



Doon Gibbs (left) and Peter Bond, both of BNL.